

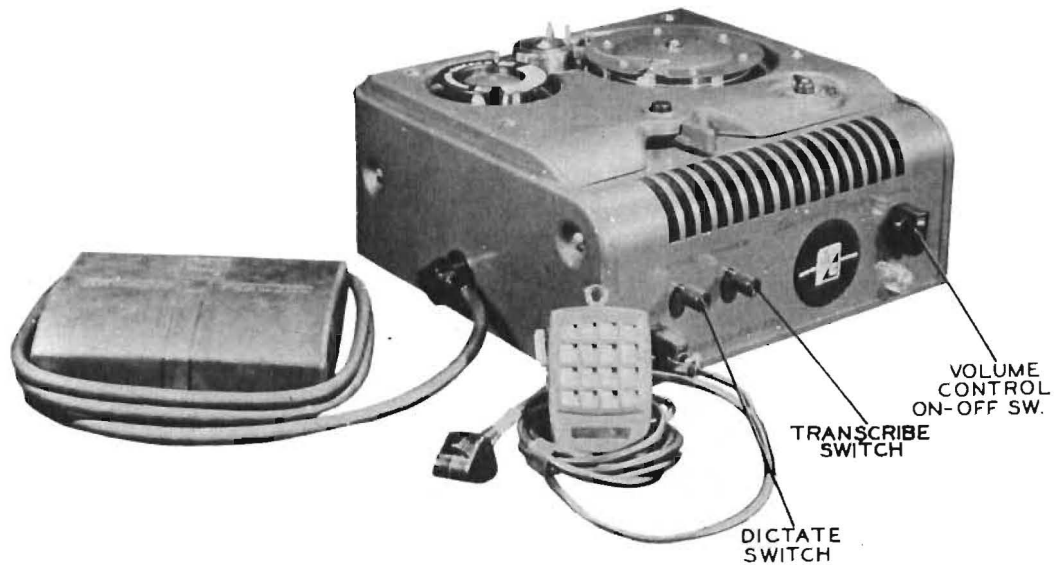
WEBSTER-CHICAGO
MODEL 228WEBSTER-CHICAGO
MODEL 228

Figure 1

GENERAL INFORMATION

The Webster-Chicago Model 228 wire recorder is designed to magnetically Record and Reproduce on the standard .0036" stainless steel recording wire. In addition to being a complete wire recorder, Model 228 includes a foot switch to start, stop and reverse the mechanism for the convenience of recording or playing back recordings, dictation, etc. The microphone also included with the Model 228, has a built-in Start-Stop switch, which permits the user to control the machine conveniently.

The Elapsed Time Indicator incorporated in this machine is calibrated quarter minute and minute intervals. This Indicator makes a complete revolution in 15 minutes.

Model 228 is designed to operate on 105-120 volt 50/60 cycle AC. 50 Cycle current will cause the recorder to run a little slower but this will not harm the motor or impair the quality of the recorder.

Never attempt to operate from Direct Current (DC) or from a power supply with a frequency other than 50/60 Cycles.

Manufactured by:

Webster-Chicago
5610 Bloomingdale Ave., Chicago 39, Ill.

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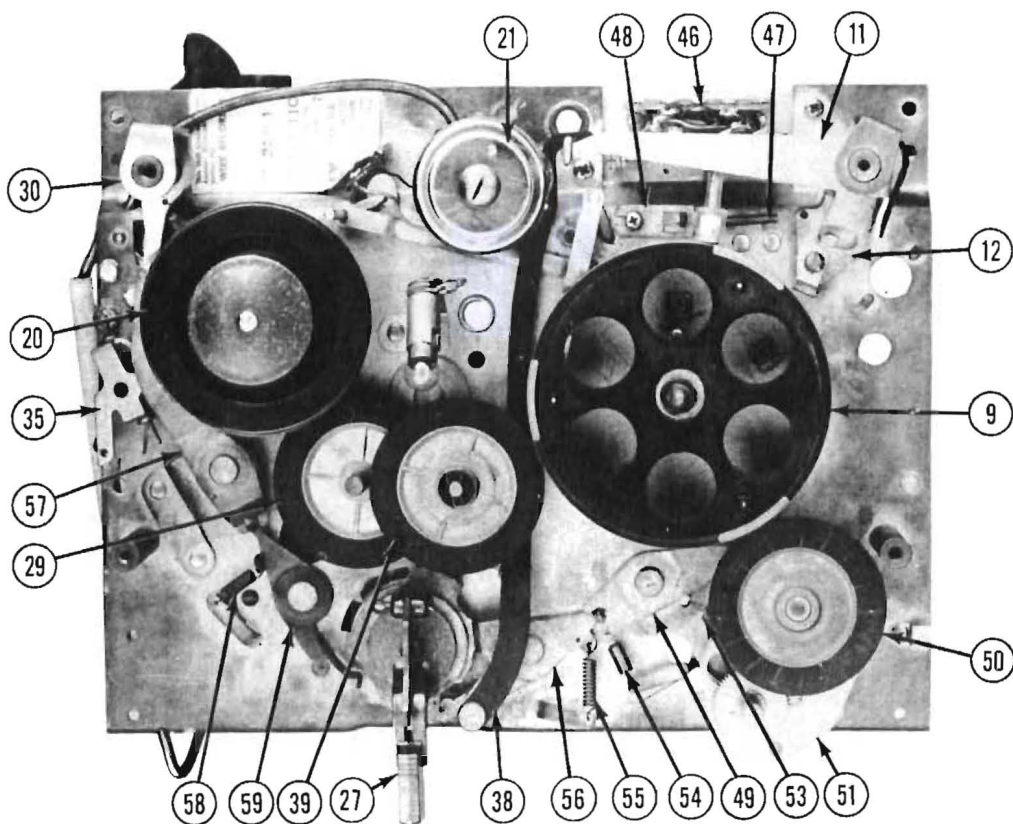


Figure 2

OPERATING INSTRUCTIONS

Making a Recording -

1. Place the recorder on a level table in order that the drive pulleys and brakes will operate properly.

2. Connect the power cord to an outlet supply 105-120 volts AC.

3. Place a spool of wire on the supply chuck (20). The spool should be placed label side up so that the wire will feed from the rear of the spool.

4. Rotate the takeup spool, by hand, until the recording head reaches the top of its vertical travel.

5. Pull the loose end of the thread leader past the recording head, through the groove in the takeup spool cover (6), and under the clip on this cover with a little spare. The clip may be loosened to permit the leader to slip under it by pressing on the button in the center of the takeup spool cover.

NOTE: Before making a recording on a new spool of wire, it is advisable to run the entire spool through the recorder once and rewind it. This is advisable for two reasons:

(a) The wire will then be wound on the spool in direct relation to the rise and fall of the recording head.

(b) The rewind spool will be somewhat more

loosely wound and the free end may "tuck in" more securely.

6. Rotate the time indicator pointer (3) to the position marked 15.

7. Turn the "On-Off-Volume" control knob clockwise until a click is heard. This turns the unit on.

Use of the Microphone -

The microphone supplied with the Model 228 has a built-in Start-Stop switch whereby the dictation machine may be controlled in "Run" position only to start and stop the machine. This switch will operate for Dictation or Transcribe. In order for the microphone switch to operate, both plugs on the end of the microphone cord must be plugged into their proper sockets. The small plug in the Input socket and the large plug into the large socket on the side of the case.

1. To make a recording using the microphone, depress the Dictate push button.

2. Adjust the Volume control to a point where the neon Recording Level Indicator just flashes when you speak into the microphone.

3. Press down on the stop (25) and turn the control lever (27) to Run.

4. The recorder may now be started and stopped at any time by using the switch on the microphone,

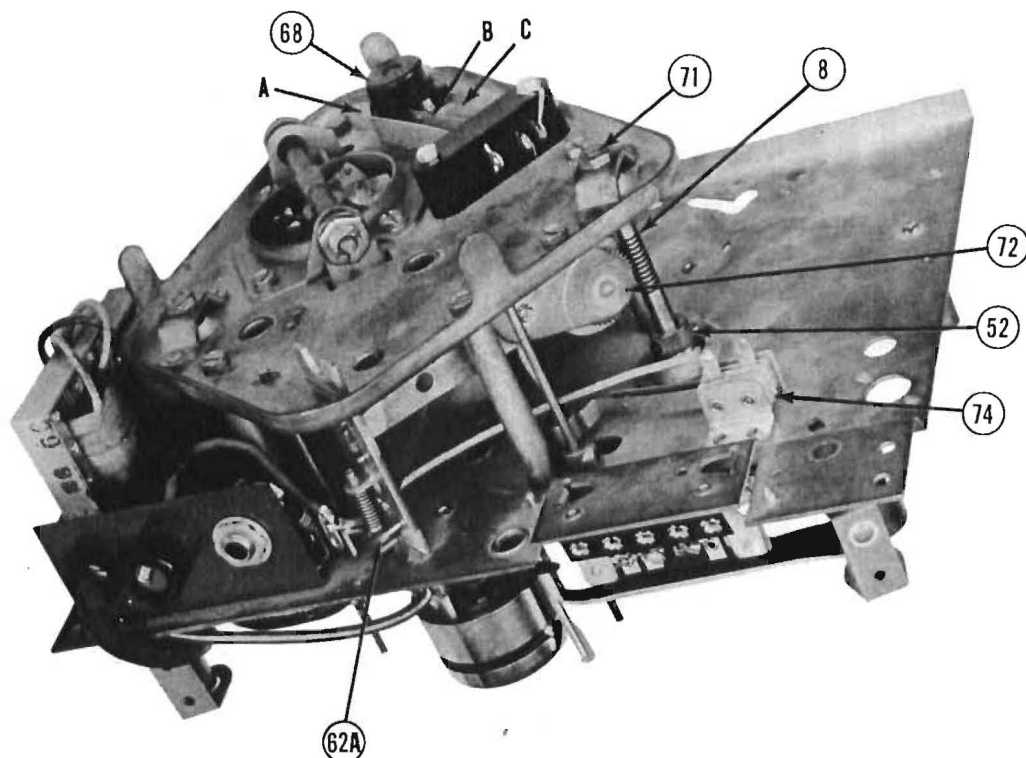


Figure 3

and whatever sound enters the microphone, while the machine is running, will be recorded on the wire.

Use of Foot Control Switch -

Model 228 includes a foot switch which may be used to "start" "stop" or "backspace" (rewind). To operate the foot switch insert its 3-prong plug into socket on the side of the case. Turn the control lever (27) to run. The "start" "stop" "rewind" operation will now be entirely controlled by the foot switch. When using the microphone with the foot switch, use only the small plug on the microphone cord which is inserted in input socket. By pressing on the right side of the foot switch will start or stop the machine, pressing on the left side of the switch rewinds the wire. The Model 228 can be operated as a normal manually operated recorder to record or play back by removing the foot switch plug from the machine.

NOTE: It is not recommended to rewind an entire spool of wire using the foot switch. Hold down the lock (25) and turn the control lever (27) to "Rewind".

To Playback a Recording -

1. For playback, the wire is threaded exactly as for recording.
2. Depress the push button "Transcribe".
3. Push down on the lock (25) and turn the control lever (27) to run. This starts the wire moving. The microphone, when plugged in, will operate the machine for stopping or starting. The foot switch

when used will start, stop, or rewind the wire. However, in each case for the wire to move the control lever (27) must be in Run position.

4. Adjust the Volume control to suit.

Erase -

If it becomes necessary to erase a recording without, at the same time, placing a new recording on the wire, the wire may be run through in the Run direction with the Volume control turned to minimum and the Dictate button depressed.

FUNCTION OF PRINCIPAL PARTS AND ADJUSTMENTS

Motor and Drive Wheel Assembly -

The motor (79) is mounted on the pivot bar (77) and is rocked forward by the cam follower (78A), which is riveted to the cover (78). The cam follower (78A) is actuated by the control lever (27) cam when the control lever (27) is turned to Run. This brings the motor shaft in to contact the idler wheel (39) which in turn drives the takeup drum (9) to wind the wire.

1. When the control lever (27) is in Stop position the control lever cam engages the cam follower just enough so the motor is held in a neutral position i. e. the motor shaft does not engage the idler wheel and the drive wheel, and the motor shaft is not touching the supply chuck.

When the control lever (27) is turned to Rewind the control lever cam is pivoted away from the cam follower (78B). The motor is then pulled back by its

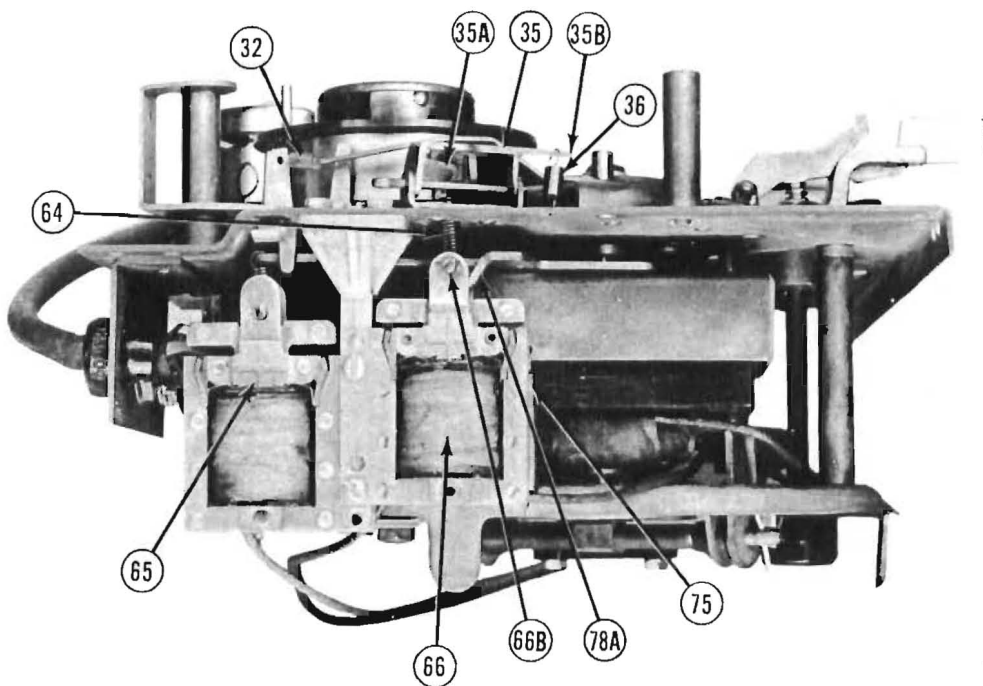


Figure 4

weight and the weight of solenoid (65) on the solenoid tilt arm (78A) plus the pull of the rewind tension spring (75). This brings the supply spool drive wheel (29) in contact with the supply chuck.

2. With the control lever (27) in the Stop position and the foot switch not plugged in, the space between the motor shaft and the idler wheel (39) and between the motor drive wheel (29) and the supply spool chuck (20) should be approximately equal $1/32''$. The position of the motor shaft is adjusted by bending the cam follower (78B) so it holds the motor in the proper position to insure the clearance desired.

3. With the control lever (27) in the "Run" position, the motor shaft should press against the idler wheel (39) which in turn engages the takeup drum (9). This engagement must be firm but not too tight.

To determine whether or not the motor shaft engagement is correct, check the mechanism as follows:

- (a) Remove the retaining clip (41) and lift the idler wheel from its shaft.
- (b) Move the control (27) to Run.
- (c) Replace the idler wheel on its shaft with one side against the motor shaft and the other side resting on the edge of the takeup drum (9). The idler wheel should overlap the drum (9) about $1/32''$. This overlap is an indication of the pressure exerted on the idler by the motor shaft and on the drum chuck by the idler. If an adjustment is necessary bend the cam follower (78B).

The Brakes -

The brakes (57) and (49) are operated by the control

lever (27) through the cam of the cam and link assembly (38) and the cam followers (56) and (59).

When the control lever (27) is turned to Run position, and the foot control or microphone not plugged in, the turned up end of the cam followers (56) and (59) will be positioned in the center of their relative brake arms (49) and (57). This removes all brake pressure to the brake arms (49) and (57) by the cam followers (56) and (59) and their connected springs (58) and (55). However a light brake pressure is applied to the takeup drum (9) and supply chuck (20) by springs (32) and (54) which are connected to their relative brake arms.

The light brake adjustment is very important when recording or playing back a recording. If the light brake pressure to the supply chuck is too light, the wire will be loose and jumpy and will wind uneven on the takeup drum. Too heavy of a light brake pressure will cause slow starting when the foot switch is used.

When the control lever (27) is turned from Run to Stop position, the cam (38) is pivoted away from the cam followers (56) and (59). This allows the tension springs (55) and (58) to pull on the cam followers which in turn applies pressure on the brake arms (49) and (57). This stops the mechanism promptly and keeps the wire from unwinding. The heavy brake applied to the takeup drum prevents back lash.

When the control lever (27) is turned to Rewind the brake arm (57) is pivot completely away from the supply chuck (20). However the control cam moves the right cam follower (56) to the center of the slot in the takeup brake arm (49) thus allowing a light brake pressure to be applied to the takeup drum by the tension spring (54). Additional brake pressure is applied to the takeup drum by the relay switch arm (46). This prevent the wire from over riding when the wire

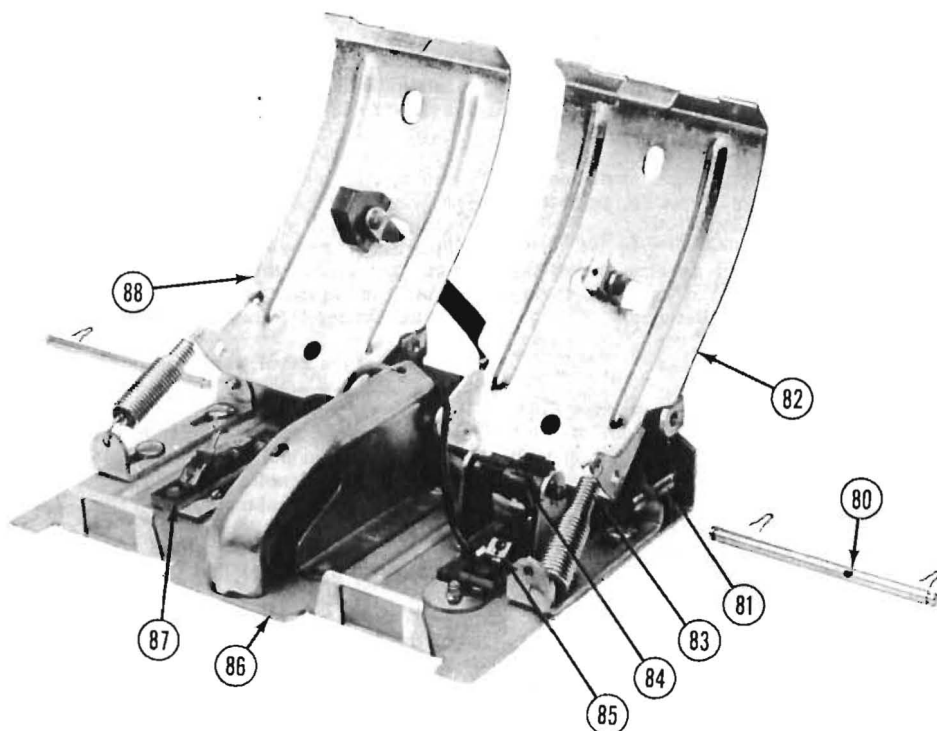


Figure 5

is rewinding at a high rate of speed.

Level Wind Adjustment -

The height of the takeup spool (7) and supply chuck (20) are adjusted by loosening the lock nuts (71) and turning the set screw, see Figure 4. The brass collars (52), (Figure 4) are set on the shaft beneath the top plate bearings to restrict the upward movement of the drum and chuck. The collar on the takeup drum shaft (9) is set so that the drum (9) is free to turn but has practically no vertical play. If the collar on the takeup drum is set too low, vertical play may cause poor rewind of the wire onto the supply spool. If set too high the drum will not turn freely. The setting of the collar on the supply spool chuck shaft should provide approximately 1/16" vertical play of the chuck.

In order to properly adjust the level wind -

1. Remove the recorder mechanism from the cabinet by removing the bottom cover and the four mounting screws from the side cover.
2. Place a one hour spool of wire on the supply chuck (20) and properly route the wire on the mechanism.
3. Turn the On-Off-Volume control switch on and move the control lever (27) to Run.
4. Check the mechanism occasionally to see how the wire is winding on the takeup spool. If wire begins to build up toward either flange of the takeup drum (7), adjust the head stroke adjustment screw (62A). Turning this screw clockwise raises the head, counter-clockwise lowers it. Rewind the wire then

run it forward again, observing the way the wire winds on the takeup spool and adjust the head until the level wind is even on the drum. Location of screw (62A) is shown in Figure 4. This adjustment is made from the top of the mechanism. The screw is accessible through a hole in the baseplate just behind the recording head.

5. Rewind the wire and observe the way it winds on the supply spool. If the wire builds up at the top or bottom of the spool, loosen the hex nut (52) on the bottom of the supply shaft (23) and turn the set screw, then tighten the nut. Turning the set screw in raises the supply chuck, counter-clockwise lowers the chuck.

Forward and Reverse Solenoids -

1. Before any forward and reverse solenoid adjustment is made, be sure the manual operated drive mechanism is operating properly. See "Motor and Drive Wheel Assembly".

2. Remove the case from the recording unit.
3. Plug in the foot control switch.
4. Plug the line cord into an outlet supplying 117 Volts.
5. Turn the Volume-On-Off control switch On.
6. Turn the control knob (27) to Run.

After the recorder has been prepared as described in steps 1 through 6, the operation of the mechanism, may be observed and adjustments made as described in the following paragraphs:

Stop Position -

When solenoid (66) is energized (stop position) by the foot switch, the motor tilt lever (78A), (assembled to the motor cover), is pulled down thereby pulling the motor shaft away from the idler wheel (39).

- (a) The space between the motor shaft and the idler wheel (39) should not be less than $1/64''$ and not more than $1/32''$.
- (b) To obtain the correct spacing, bend the motor tilt lever (78A) up or down to increase or decrease the distance.

Forward Position -

When the switch is opened, the motor tilt lever (78A) is released by the solenoid (66), allowing the motor shaft to engaged the idler wheel (39) which in turn drives the takeup drum.

- (a) Check the space between the solenoid anchor pin (66B), Figure 5 and the top of the motor tilt lever (78A). The anchor pin (66B) should clear the motor tilt lever by approximately $1/32''$.
- (b) To obtain this demision, bend the lug, which is directly above the "T" plunger of the solenoid, up or down to obtain this $1/32''$ clearance.

NOTE: A heavy brake is applied against the supply spool brake shoe by the solenoid (66) and brake arm (35) when the foot switch stops the recorder. In the Run position a $1/16''$ to $3/32''$ clearance between the tip of the brake arm (36) and the brake shoe on the left brake arm (57) is required. This clearance of $1/64''$ when the control lever is in the Rewind position.

To Adjust -

- (a) If the tension of spring (64) on the brake arm (35) is too light, the spool chuck will coast instead of stopping immediately. To correct this, bend the spring anchor arm (35A) to increase the spring tension. See Figure 5.
- (b) If the tension of spring (64) on the brake arm (35) is too great, the solenoid will not be able to seat properly therefore, bend the anchor arm (35A) down slightly to lessen the spring tension.
- (c) After the above adjustment is made turn the control knob to Rewind and check the clearance between the tip of the brake arm (35) and the brake shoe of the left brake arm (57). If there is not at least a $1/64''$ clearance between these two parts, bend the anchor arm (35B) up so as to increase the tension of spring (36).

Reverse Position -

The "Reverse" section of the foot control is a single pole double throw switch. In its normal position, the ground circuit to the rewind solenoid is open and the contact to transfer the "ground" to the Forward

switch is closed.

While the Reverse control is held down the "ground" is removed from the Forward switch and the Reverse solenoid (65) is energized. The solenoids thereby pulls on the motor tilt arm (78A) which in turn engages the drive wheel (29) with the spool chuck (20). The motor tilt lever (78A) also pushes against the brake release lever (30) which pushes the light brake pad away from the spool chuck (20). As soon as the take-up drum (7) moves counter-clockwise, the relay switch (46), actuated by the switch arm, transfers the 28 volts from the forward solenoid to the relay (76), as explained under "Relay and Relay Control Switch".

To adjust the reversing mechanism of the recorder do so as follows -

1. With reverse solenoid (65) energized, insert a $1/32''$ gauge between the solenoid plunger and the face of the solenoid, (the solenoid will hum and chatter but do not be alarmed).
2. With the solenoid in this position, the drive wheel (29) should just touch the supply spool (20).
3. If this engagement is too great, bend the end of the motor tilt arm, (78A) down until the condition is corrected.
4. With motor tilt arm (78A) properly adjusted and the gauge removed, the additional movement of the drive wheel (29) toward the chuck should give a quick pickup in rewind.

Emergency Brake -

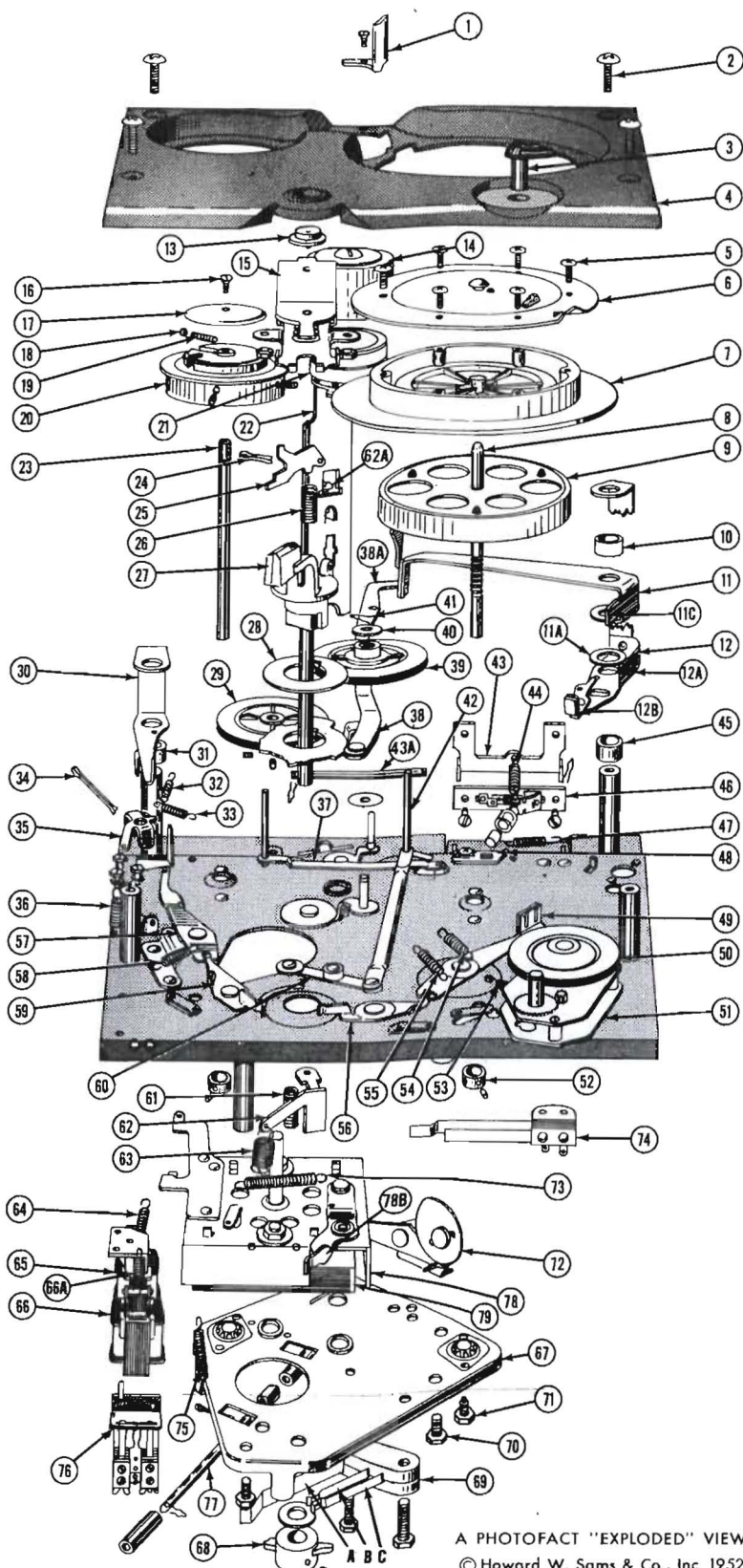
The emergency brake (items 11 and 12), Figure 2 is ready to work at any time during rewind. If during rewind the recording wire becomes loose or is broken, the emergency brake immediately applies a heavy brake to the takeup drum (9) stopping the drum. This prompt action prevents the "flywheel effect" of the takeup drum from spilling or tangling the wire.

When the control (27) is turned to Rewind, the hook end of link (38A) is moved away from the stop arm (11). This allows the stop arm to move against the wire. During Rewind and as long as the wire winds properly, the wire will be tight enough to hold the emergency brake away from the takeup chuck (9). However, if the wire should brake, the stop arm (11) is released by the wire, thereby allowing the emergency brake, to engage the takeup drum (9) immediately stopping the drum, thus preventing the wire from spilling. Tension spring (12A) has a very short but moderately strong pull. However, it is almost completely relaxed when the upright end of the control arm (11) comes to within $1/8''$ to $1/16''$ of the hook on the end lever (38A).

If the wire breaks, the pull of the spring is strong enough to snap the control arm (11) back, thus actuating the emergency brake.

Adjust the emergency brake as follows -

With no wire on the recorder and the control lever (27) turned to Rewind, there should be about $1/16''$ clearance between the brake control arm (11) and the hook on the end of lever (38A), when the brake shoe (12B) barely touches the chuck (9).



A PHOTOFAC "EXPLODED" VIEW
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1. Remove spring (47) from the emergency brake (12).

2. If necessary, slightly loosen the set screw holding the brake pad (12B) to give a 1 to 2 pound brake pressure on the takeup drum chuck (9) when fully engaged. The brake pressure should not be so heavy that it breaks wire, yet it should not allow the drum to coast after the emergency brakes engages.

3. If necessary, bend tail (11C) of the control arm so that the brake pad just touches the drum chuck (9) when there is 1/16" to 1/8" clearance between the control arm, (11) and the hook (38A).

4. Attach the tension spring (47). If, after spring (47) is attached to the emergency brake (12), the brake pad engages the drum (9) or does not touch the drum, adjust the spring tension.

(a) Loosen set screw holding the adjusting bracket (48).

(b) Adjust the bracket until the pad (12B) just touches the drum. The pad should be adjusted so the drum can be turned counter-clockwise, by hand, without the brake grabbing. Then increase the spring tension just enough so the brake will grab, unless the control arm (11) is held more than 1/16" to 1/8" away from the hook lever (38).

The Relay and Relay Control Switch -

The relay control switch (46) is a single pole double throw switch. This switch (46) is in constant contact with takeup drum and is actuated by the direction of rotation of the drum.

When the takeup drum is running in a clockwise direction, the control switch connects the (28) volt solenoid control voltage to the Run-Stop solenoid (66). The circuit is completed to ground through the foot switch. As long as the relay is not energized the contacts "3-4" are closed completing the circuit from the RF bias oscillator to the erase and bias coils of the head and contacts "6-7" are open, permitting the 6AR5 to operate in a normal manner. While playing back the recording, the bias circuit is opened by the "Transcribe" switch even though contacts "3-4" remain closed.

When the takeup drum (9) is turning "backward" during rewind, the relay control switch (46) is automatically reversed. The 28 volts are removed from the run stop solenoid (66) and applied to the relay (76). This opens the bias circuit contacts "3-4" to prevent accidental erasure and closes the 6AR5 grid shorting contacts "6-7" to kill the Audio signal.

The relay control switch arm should meet the takeup drum chuck at a right angle or up to 15° toward the recording head. It should never lead the takeup drum or it will rest past its pivot point and not flip back when the drum turns counter-clockwise. The upright form lug which limits the throw of the switch (46) towards the head should be bent so there is about 1/16" movement of the switch after the contacts have "made". There should also be a slight movement in the opposite direction after the contacts "make" with the drum going forward.

The solenoid ground switch (69B and C) is opened

mechanically when the main control lever (27) is moved to Rewind. It is then impossible for the solenoids to act. They can operate only when the control lever is in the Run position and the ground switch closed.

It is important that the switch contacts (69B and C) (see Figure 3) "make" before the control lever reaches the first "hump" of the cam, the spot at which it becomes hard to move the lever at the same time they cannot be too close together or arcing will be heard when the lever is moved from Run to Stop. Special care must be used when adjusting the spacing of the contacts of this switch.

TROUBLES

Rewind Starts Too Slowly With Foot Control -

1. The rear section of the motor tilt arm (18A) may be bent too high, thereby causing the drive wheel (29) to be pulled too tightly against the supply spool chuck (20). See "Reverse Position" under "Forward and Reverse Solenoids".

Emergency Brake Fails to Work or Grabs During Normal Rewind -

1. Brake shoe pad may be worn thereby causing the brake to fail in operation.

2. Emergency brake out of adjustment. See "Emergency Brake".

3. Spring (47) may be out of adjustment. See "Emergency Brake".

Wire Does Not Wind on Supply Chuck or Takeup Drum Evenly -

1. Supply chuck shaft (23) or takeup drum shaft (8) out of adjustment. See "Level Wind Adjustment".

2. Check recording head and slide to see if it moves freely.

(a) Dirt may have accumulated on the head slide (22) or the lubricant may have hardened. Clean the slide with carbon tetrachloride and lubricate with light grease to insure smooth operation.

(b) The head slide (22) may be bent, causing it to stick. Repair or Replace.

Wire Winds Loosely -

1. Check the "Light Brake" on both drums. If they are not adjusted properly the wire will wind loose and uneven.

(a) See Paragraph on "The Brakes" under Adjustments.

Mechanism Will Not Reverse When Foot Control is Used -

1. Motor tilt arm (78A) incorrectly adjusted thereby preventing proper engagement of the drive wheel (29) and supply chuck (20).

(a) See "Reverse Position" under "Forward and Reverse Solenoids".

Erases During Reverse -

Relay control switch (46) incorrectly positioned, thereby preventing the switch from being reversed when the takeup drum reverses.

(a) See "Relay and Relay Control Switch".

Recorder Will Not Turn On -

- 1. Check for burned out fuse.
- 2. Loose A. C. plug connection.
- 3. Automatic stop control arms loose.

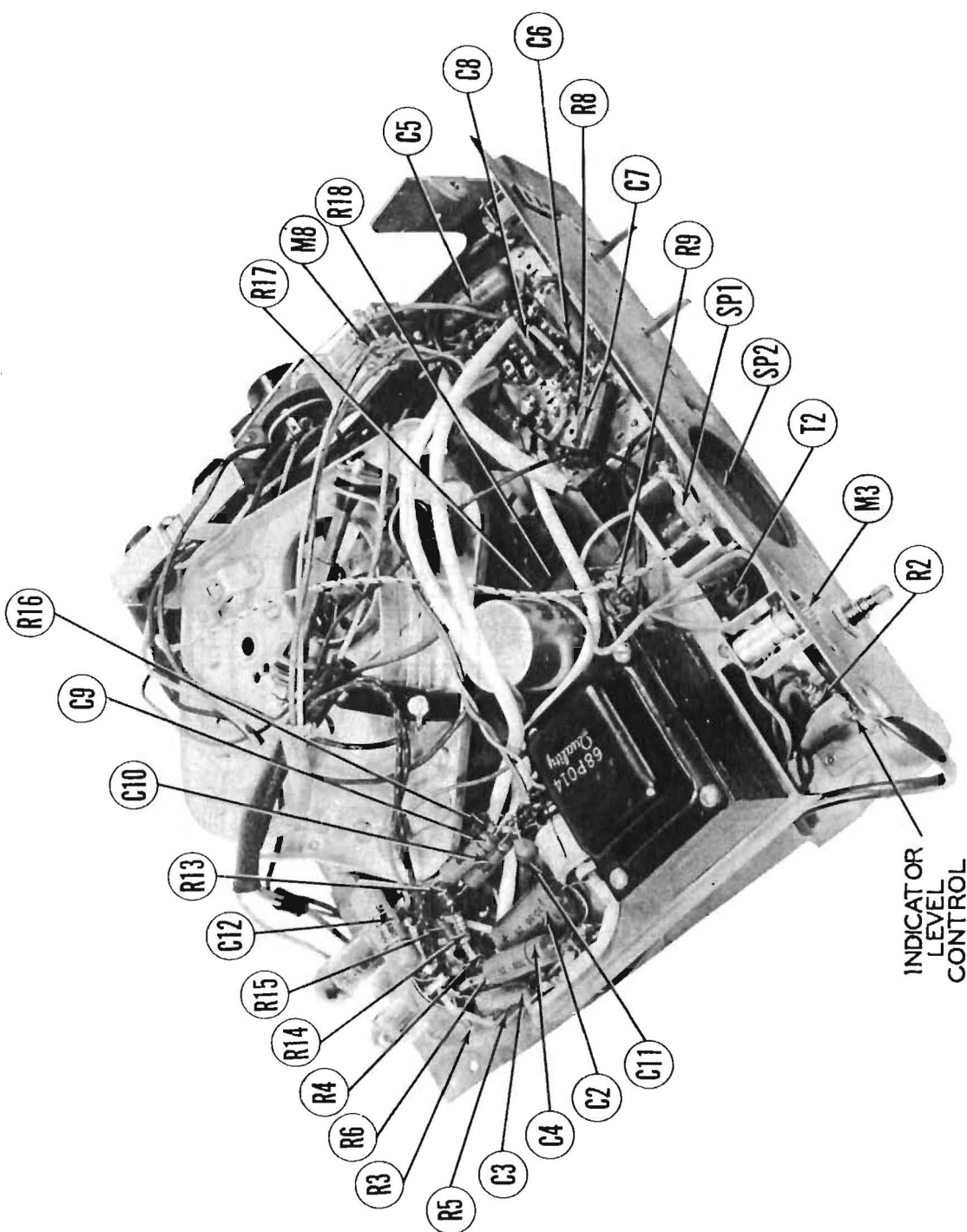


Figure 6

VERSIER-CHICAGO
MODEL 228



ALL MEASUREMENTS TAKEN WITH PUSHBUTTONS IN "OUT" POSITION
? MEASURED FROM PIN 7 OF V4

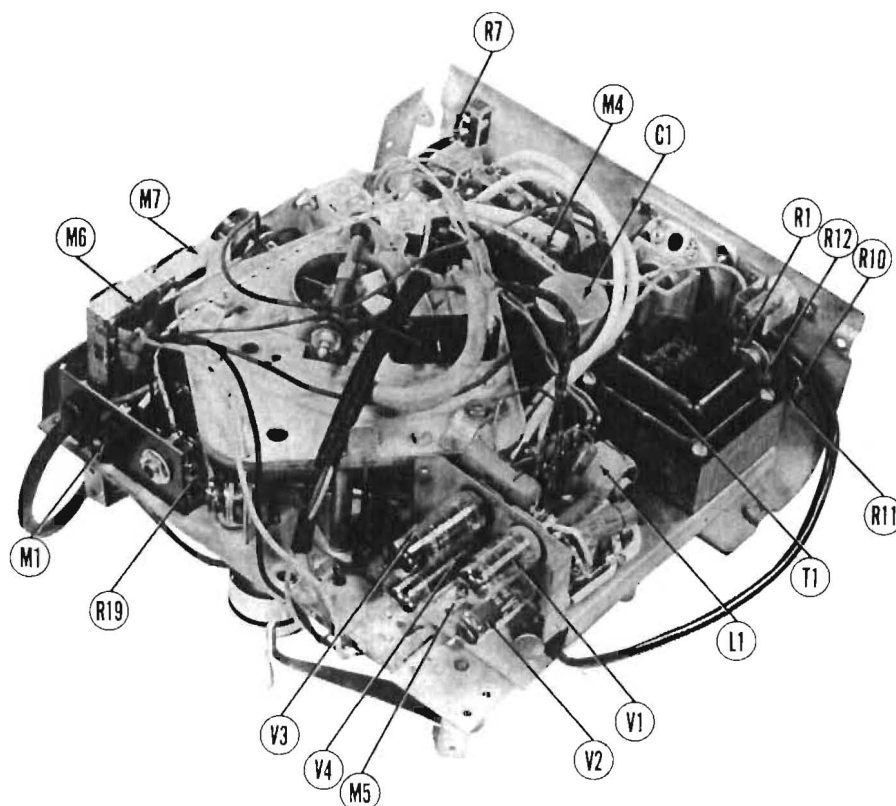


Figure 7

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	42P224	Wire Guide			includes items 16, 17, 18, 19, 20 and 23.
2	26P826	Mounting Screw-Top Plate		26P633	Set Screw-Supply Spool
3	49X106	Pointer-Elapsed Time		2904	Recording Head
4	11x637	Top Plate	21	26P1024	Head Retaining Screw
5	26P804	Drum Cover Mounting Screw		11X741	Slide and Socket Assembly
6	11X181W	Takeup Drum Cover	22	38P021	Head Socket
	26P305	Leader Clip Tension Spring		50P205	Socket Retainer
	46P137	Leader Clip Tension Spring		41P618	Supply Chuck Shaft
7	TD-422	Takeup Drum-includes items 5 and 6	23	27P231	Cotter Pin for item 25
8	47P030	Takeup Drum Shaft	24	45P946	Stop for Control Lever item 27
9	11X344	Drum and Shaft Assembly	25	46P230	Spring for item 25
10	41P771	Spacer-Upper for item 11	26	42X195W	Control Lever
11	11X641	Emergency Stop Arm	27	45P992	Control Lever Spacer
11A	25P458	Washer	28	11X195	Drive Wheel
12	11X642	Safety Lever and Brake Assembly	29	45P1171	Brake Release Lever
	45P1167	Brake Shoe	30	41P771	Spacer for item 30
	28P008	Brake Pad	31	46P130	Tension Spring-Left Brake Arm
13	49P139	Safety Button	32	46P256	Tension Spring for item 30
14	45P987	Recording Head Cover			
	26P1023	Head Cover Screw	34	27P207	Cotter Pin for item 35
15		Mounting Bracket for Safety Button	35	45P965	Brake Lever
	46P228	Compression Spring for Safety Button		45P856	Bracket for item 35
16	26P827	Chuck Cap Mounting Screw	36	46P165	Tension Spring for item 35
17	45P492-W	Chuck Cap	37	11X343	Shut-Off Link and Coupling
18	48P014	Steel Ball	38	11X636	Cam and Link Assembly
19	48P142	Compression Spring-Steel Ball	39	11X522	Idler Wheel
20	11X347	Supply Chuck and Shaft Assembly	40	25P030	Felt Washer for item 39
			41	50P125	Retaining Clip for item 39
			42	41P623	Motor Shut-Off Crank

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
43	45P967	Bracket for item 46	86		Foot Switch Base
43A	41P763	Pivot Pin for item 46	87	32P067	Switch-Reverse
44	46P165	Tension Spring-Toggle Switch	88	45P998	"Reverse" Foot Pedal
45	41P770	Spacer-Lower for item 11		46P243	Compression Spring
46	11X742	Switch, Bracket and Brake Assembly Complete-includes items 43, 43A, 44 and the following parts -		24P053	Rubber Cover
	32P064	A. C. Switch	ELECTRICAL PARTS LIST		
	49P140	Brake Post	Item No.	Use and Description	
	32P012	Brake Pad	V1	1st. AF Amplifier, 6AT6	
47	46P265	Tension Spring for Safety Brake	V2	2nd. AF Amplifier, 6AU6	
48	45P1177	Adjusting Bracket for Tension Spring item 47	V3	Bias Oscillator-Power Output, 6AR5	
49	45P611	Right Brake Arm	V4	Rectifier, 6 X 4	
	28P008	Brake Pad	C1A	Filter (Electrolytic) 20 MFD. @ 450V.	
50	11X359	Wheel and Pinion	C1B	Filter (Electrolytic) 10 MFD. @ 450V.	
51	11X743	Clock Mechanism and Wheel	C1C	Filter (Electrolytic) 10 MFD. @ 350V.	
52	41P557	Play Adjusting Collar	C2A	Output Cathode Bypass (Electrolytic) 10 MFD. @ 25V.	
	26P633	Set Screw	C2B	2nd. AF Amp Cathode Bypass (Electrolytic) 10 MFD. @ 25V.	
53	46P205	Tension Spring-Clock Mechanism	C3	Audio Coupling, .01 MFD. @ 100V.	
54	46P257	Tension Spring Right Brake Arm	C4	Audio Coupling, .02 MFD. @ 400V.	
55	46P131	Tension Spring-Cam Follower	C5	Audio Coupling, .047MFD. @ 400V.	
56	45P521	Right Cam Follower	C6	Tuning Indicator Coupling, .01 MFD. @ 400V.	
57	45P966	Left Brake Arm	C7	Tone Compensation, .001 MFD. @ 600V.	
	28P008	Brake Pad	C8	Tone Compensation, .001MFD. @ 600V.	
58	46P131	Tension Spring-Cam Follower	C9	Oscillator Feedback, .002 MFD. @ 600V.	
59	45P719	Left Cam Follower	C10	Oscillator Grid Cap., .002 MFD. @ 600V.	
60	11X342	Shut-Off Link	C11	Fixed Trimmer, .002 MFD. @ 600V.	
61	46P135	Head Stroke Adjusting Spring	C12	Output Screen, .047 MFD. @ 400V.	
62	45P544	Head Stroke Adjusting Bracket	R1	Volume Control, 1 MEG., 1/2 Watt	
62A	26P284	Head Stroke Adjusting Screw		SPST Switch	
63	46P132	Head Slide Tension Spring	R2	Indicator level Control, 500K Ohm, 1/2 Watt	
64	46P272	Tension Spring for item 65	R3	1st. AF Amp. Grid, 4.7 MEG., 1/2 Watt	
65	65P035	Rewind Solenoid (Rear)	R4	1st. AF Amp. Plate, 470K Ohm.	
	41P918	Pivot Pin for item 65	R5	2nd. AF Amp. Cathode, 1000 Ohm.	
66	65P034	Stop and Run Solenoid (Front)	R6	2nd. AF Amp. Plate, 39K Ohm.	
	41P762	Pivot Pin for item 66	R7	Mike Input Shunt, 1 MEG.	
66A	46P254	Tension Spring for item 66	R8	Tone Compensation, 68K Ohm.	
67	11X740	Sub Base Assembly	R9	Indicator Network, 470K Ohm.	
68	49P105	Switch Cam	R10	Indicator Network, 470K Ohm.	
69	49P060	Switch Black	R11	Indicator Network, 220K Ohm.	
A	45P728	Switch Leaf	R12	Indicator Network, 270K Ohm.	
B	11X800	Switch Leaf	R13	Bias Oscillator Grid, 3900 Ohm	
C	11X339	Switch Leaf	R14	Output Grid, 68K Ohm.	
70	26P747	Screw and Lock Washer	R15	Output Cathode, 560 Ohm, 1/2 Watt-See Note	
71	11X277	Spool Weight Adjusting Screw Assembly	R16	Output Screen, 22K Ohm, 1 Watt	
72	11X345	Cam, Gear and Rocker Assembly	R17	Filter, 15K Ohm, 1/2 Watt	
73	46P182	Tension Spring-Motor Cam Follower	R18	Filter, 1000 Ohm, 2 Watt	
74		Leaf Switch for Automatic Shut Off	R19	Output Transformer Shunt-Wire Wound 6.8 Ohm.	
75	46P281	Motor Tension Spring	*	Note - Some Models Use 470 Ohm Resistor In This Application	
76	65P038	Relay	T1	Power Transformer	
77	41P753	Motor Pivot Pin	T2	Output Transformer	
	50P125	Retainer	L1	Erase Oscillator Coil	
	27P124	Cotter Pin	SP1	Speaker 2 - 1/2 P.M.	
	41P839	Spacer	SP2	Cone, (3.2 Ohm Voice Coil)	
	51P047	Motor Shaft Bearing	M1	Fuse (1 Amp.)	
78	17X507	Bearing and Cover Assembly	M2	Pilot Light (Type # 51)	
79	15X118	Motor and Cover Assembly	M3	Neon Light (Type N E 51)	
80	41P775	Pivot Shaft	M4	Record - Playback Switch	
81	41P774	Adjusting Screw for Foot Tension	M5	Shut - Off Switch	
82	45P999	"Forward" Foot Pedal	M6	Rewind Solenoid	
83	46P247	Tension Spring	M7	Stop - Run Solenoid	
84	49P142	Ratchet	M8	Relay	
	41P773	Shaft for Ratchet			
85	32P066	Switch-Forward			